Green Supply Chain Management (GSCM): A Research Agenda

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Abstract **- The concept of green supply chain management (GSCM) is now gaining more attention among practitioners due to its ability to help companies address environmental issues. Nevertheless, studies on GSCM practices and outcomes extensively come from multinational companies compared to fully owned Malaysian companies, especially the Small Medium Enterprises (SMEs). This conceptual paper discusses GSCM in global context and explores further directions of GSCM research in Malaysia. The discussions led to conclusions that the main drivers of GSCM implementation are mainly the pressure of regulators, customers and public awareness. Moreover, the implementation can have positive impacts on organizations economic performance and preservation of the environment. Consequently, more research is needed on the implementation of GSCM among Malaysian SMEs, especially in terms of the key practices from the perspectives of the practitioners.**

Keywords **-** *Green Supply Chain Management (GSCM), Small and Medium Enterprises (SMEs),*

1. Introduction

Sustainability issues related to the environment have gained much attention among stakeholders. This is compounded by the pressure and drive accompanying globalization, which has further prompted organizations to improve their environmental performance [1]. Awareness of environmental issues has gradually become part of the overall corporation culture and, in turn, has helped to reengineer the strategies of organizations. Moreover, business organizations have been said as the source of most of the environmental problems [2]. As a result, more organizations choose to adopt green supply chain management (GSCM) practices as an integrated approach to address the issues.

International Journal of Supply Chain Management
IJSCM, ISSN: 2050-7399 (Online), 2051-3771 (Print)

According to Rao and Holt [3], GSCM can help organizations to minimize the negative impacts of industrial processes and enhance competitive advantage. Specifically, GSCM not only allow firms to achieve substantial savings in cost, but it would also enhance sales, market share, exploit new market opportunities, which lead to greater profit margins [3]. The practices can be extended to the entire value chain, from supplier to customer, for example when organizations inform buyers of ways to reduce their impact to the natural environment [4].

In Malaysia, environmental issues have increasingly become a priority for the government and the public. However, fully owned Malaysian firms have the lowest level of participation in green supply chain initiatives compared to foreign based companies [5]. This could indicate that there are barriers and obstacles that are hindering the local manufacturing companies from greening their supply chain. This paper, therefore, aims to discuss GSCM practices in the global context and identify the future directions that Malaysian companies, especially SMEs, could explore to enhance their implementation of the practices.

2. Overview of Green Supply Chain Management (GSCM)

According to Hervani, et al. [6], GSCM involves various activities such as green design, green procurement, total quality environmental management and eco-packaging. GSCM is the practices of integrating environmental thinking into supply chain management, including product design, material sourcing and selection, manufacturing process and delivery of the final product to consumers [7]. It also involves monitoring and improving environmental performance in the supply chain during a product's life cycle [8]. Consequently, GSCM is a proven way to reduce a company's impact on the environment while improving business performance [9]. A well-

established GSCM focuses upon sustainability in each supply chain stage, which ranges from product design, material selection, manufacturing as well as distribution of the product to user via forward logistic process and collecting back used product for either repair, recondition, remanufacture, recycle or disposal through reverse logistic practices [10].

3. Green Supply Chain Management in the Global Context

Banerjee and Linstead [11] noted that environmental concerns have been spread from the local level to regional and to global. Thus, from the perspective of environmental concerns, integration of environmental concerns and SCM has been in focused for two decades [3]. Jabbour and de Sousa Jabbour [12] indicated that the internal environmental management should be the first GSCM practice adopted to increase the organizational culture, green teams, and empowerment. Internal environmental management also provides the ground for the adoption of GSCM practices. For instance, green human resources encourage employees to consider waste management, pollution prevention, eco-efficiency and investment recovery. Soubihia, et al. [13] examined the relationship between adoption of green operational practices and green performance in Brazilian ISO 9001 certified firms and found green operational practices do influence the green performance.

Huang, et al. [14] investigated the pressures and drivers that have been experienced by Chinese manufacturing SMEs. They concluded that Chinese manufacturing SMEs face pressures from different sources including regulations, customers, suppliers and public awareness to implement GSCM practices and being motivated by different drivers to implement GSCM practices. Another study in South Korea examined the effects of GSCM on supplier's environmental and operational performance with perspective of capital and relational social capital accumulation in supply chain. The study showed relational social capital is positively associated with operational performance and environmental performance affects operational performance significantly [15].

In the study of Zhu, et al. [16] among Chinese owned SMEs, the implementation of GSCM practices were the result of institutional pressures for environmental protection. This was supported by another study in China by Choi, et al. [17], which suggested the internal green marketing to have a positive effect only on GSCM but it does not have significant impact on firm's market performance. There was one interesting finding which indicated the drivers of environmental processes and their impact on performance. In developing countries either law is written loosely for SMEs therefore it is ineffective for environment protection or written strongly knowing that it will not be enforced [18]. In the developed nation, it was found that GSCM results in improved environmental, economic and operational performance, which consequently enhances organizational performance explored [19].

Based on the discussions, there are few essential highlights, which are:

- Implementations of GSCM are mostly because of the pressure of regulators, customers and public awareness.
- The main outcome expected from the implementation of GSCM is the protection of the environment.
- GSCM may have impact of the economic performance in certain organizations.

4. Green Supply Chain Management in Malaysian Context

The studies of GSCM in Malaysia are still limited and findings are not consistent. Despite the importance of GSCM in alleviating environmental issues and providing economic benefits to organizations, little is known about green supply chains, especially in the context of Malaysia [20]. Common perception about GSCM practices is, it is environment friendly in the production of products, processes, systems and technologies and the way of conducting business [21]. Environmental issues have become very important issue of concern for Malaysian government and the public [2]. According to a survey conducted by Tan [22] in Malaysian manufacturing companies, it is found that they concern of environmental attributes in their production because of following three reasons, for the sake of competitive advantage, to gain government incentives, and because of influence of authorities.

Khor and Udin [23] investigated the effect of green product design and resource commitment in Malaysian ISO 14001 certified electrical and electronic manufacturing firms. From the research it was found that green product design has crucial product characteristics that elevate recoverability of electrical and electronic equipment's. It was also found using the substitution of heavy metals or hazardous substances with environmentally compliant raw materials facilitate reduction of toxic emission while design for environment minimizes the risk of pollution due to exposure of hazardous materials. A research by Wan Mahmood, et al. [24] indicated that Malaysian ISO 14001 certified manufacturing companies improved manufacturing performance leads to an integrated green supply chain as well as causes enhancement of environmental compliance, optimization of

operational resources and product recycling activities.

Hsu, et al. [25] studied green supply chain initiatives and investigated the barriers in context of SMEs in Malaysia. The study confirmed GSCM drivers are influencing manufacturing firms to take green supply chain initiatives. Moreover, research findings showed that competitors pressures as the strongest factor and socio-cultural is the weakest factor among the green supply chain drivers. Kuan and Udin [26] analyzed the impact of reverse logistics and electrical and electronic companies in Malaysia. The findings stated that Malaysian manufactures are not proactive in gaining advantage of product take back and processing activities as they are considered cost-oriented services. It also revealed most of the companies that provide reverse logistics programs are subsidiary companies of multinational corporations and majority of local establishments have not obtained certification for environment.

Another study by Ann, et al. [27] explored the impacts of EMS certification on the performance of firms, including economic and environmental aspects and perceived customer satisfaction. The results showed, EMS certification positively effects both environmental and economic performance. Moreover, strongest outcome of EMS was the improvement in corporation image. It was also found from the research benefits of EMS certification are more worthy than its cost of implementation.

Wooi and Zailani [28] investigated GSCM initiatives and barriers in the context of Malaysian SMEs. The results revealed a low adoption level of green supply chain initiatives in SMEs. In addition, resource was found as a key barrier, which impedes the adoption of GSCM initiatives, followed by technical barrier. Besides that, the firm that operates in family-oriented business strategies has lower adoption level of GSCM compared to business-oriented firms. They concluded that green productivity can increase product quality as well as reduce waste, pollution, and risk. It was also found, green productivity does not reduce manufacturing cycle time, unit manufacturing cost and absenteeism, but it increases healthier environment.

5. Research Directions

GSCM is receiving more attention among academicians as well as practitioners. Remarkable research addressed drivers, practices and outcomes of GSCM. Significant research has been done in developed countries range from supplier selection, which includes all direct or indirect stakeholders of supply chain. Being a developing country, the Malaysian government and other authorities are striving for the implementation of GSCM. Green initiatives are taken by the industries in response to pressure for the implementation of green practices from different sources together with incentives offered by the government. Although previous studies have been conducted on GSCM in terms of practices, drivers, barriers, and outcome, the impact of these studies is yet to manifest in practices towards improving GSCM performance and eventual adoption by the key industry players among SMEs.

Drivers or the pressures for the implementation of GSCM are almost similar in developed and developing countries, but in term of effectiveness, the type of drivers may vary from one to other country. Hence, further research need to explore substantially the extent of GSCM adoption in developing countries like Malaysia. It is inevitable for the authorities to find the drivers that are more effective in facilitating the implementation of GSCM and empower the achievement of environmental goals. The barriers in the implementation of GSCM has been explored, but still there is a need to enhance the research about the barriers for the implementation of GSCM which will provide a better understanding about the problems of GSCM implementation. It will also provide a direction to review policy for the implementation of GSCM.

GSCM practices are the key contributor toward the successful implementation of GSCM. Internal environmental management is the first step toward the implementation of GSCM, while eco-design is the combination of life cycle analysis and design for environment approaches which are used in green design. Several researchers used green purchasing, cooperation with customer and investment recovery practices to explore the impact of mentioned practices upon environmental, economical, operational performance outcomes. However, there is still a lack of research about green information system in the Malaysian manufacturing industries. This gap needs to be addressed to enrich the research on green information system as information is the main stream of communication between departments and stakeholders of a firm. Recent research is addressing green marketing and green human resource practices and trying to find the impact of these practices on performance. If such kind of research is conducted in Malaysia, it may help to boost the implementation of GSCM in industries. Lastly, it is also important to explore the motives of GSCM practices in order to provide an in-depth understanding of the benefits to be achieved in terms of an enhance GSCM performance.

Acknowledgements

This work was supported by Ministry of Education (MOE) under Grant FRGS/1/2016/SS03/UTHM/02/2.

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